**2016 SCIENCE OLYMPIAD COBRA INVITATIONAL METEROLOGY QUESTION PAPER**

DO NOT WRITE ON THE QUESTION PAPER. ONLY WRITE ON THE ANSWER SHEET.

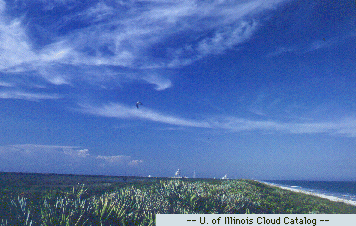
1. Which three gases make up the majority of our atmosphere?
2. Name at least two variable gases in our atmosphere.
3. Why these gases are considered “variable”?
4. Put the four layers of the atmosphere in order, from the ground up.
5. In which layers of the atmosphere does an inversion occur?
6. What percent of the Earth’s water is located in the oceans?

a. About 5%

1. About 50%
2. About 25%
3. About 97 %
4. Which layer of earth’s atmosphere does weather occur?
5. Troposphere
6. Stratosphere
7. Mesosphere
8. Thermosphere
9. Exosphere
10. Ozone, located in the stratosphere, protects us from?
11. harmful UV radiation
12. sunlight
13. infrared radiation
14. What is a temperature inversion?
15. Cold air under warm air
16. Warm air under cold air
17. A front that is NOT moving is called a?
18. Warm front
19. Occluded front
20. Stationary front
21. Dry line
22. When a cold front overtakes a warm front, it is called a(n)
23. Cold front
24. Stationary front
25. Occluded front
26. Impossible to detect
27. What is an air mass?
28. A large body of air that has similar characteristics throughout it
29. Pressure exerted by a mass of air at a given point
30. A boundary that separates a warm air mass from a dry air mass
31. The sun's rays are strongest or most direct around the
    1. North Pole  (2.) South Pole (3.) Equator  (4.) Atlantic Ocean
32. Air currents develop when cool air sinks and forces
    1. other cool air to move (2.) warm air somewhere else to rise    (3.) a high-pressure area to move (4.) a low-pressure area to move
33. The most violent kind of storm is a(n)  (1.) thunderstorm  (2.) fog  (3.) tornado  (4.) air current
34. Radiation from the sun is  (1.) all reflected into space by the atmosphere (2.) all absorbed by the earth's surface  (3.) all reflected into space by the earth's surface  (4.) partially absorbed and partially reflected by both the atmosphere and the earth's surface
35. The main source of energy for the atmosphere is the
    1. the Sun  (2.) tides  (3.) the moon (4.) radioactivity
36. \_\_\_\_\_\_ is the transfer of heat due to density differences in air.
    1. Conduction (2.) Convection   (3.) Reflection   (4.) Reduction
37. The planetary wind system results from (1.)  the rotation and uneven heating of the   
        earth  (2.) different climates in different regions  (3.) the sun and tides (4.) local winds
38. Acid rain is chiefly due to the pollutants (sulfur and nitrogen oxides) combining in the   
         atmosphere with  (1.) carbon dioxide (2.) water vapor  (3.) oxygen  (4.) nitrogen
39. Ash and dust thick enough to block the sun's rays around the world can be added to the atmosphere by  (1.) volcanic eruptions  (2.) acid rain  (3.) a nuclear reactor   (4.) plant pollens
40. Oxygen is added to the atmosphere by  (1.) respiration and burning  (2.) respiration only (3.) burning and photosynthesis   (4.) photosynthesis only

**Identify the Clouds**

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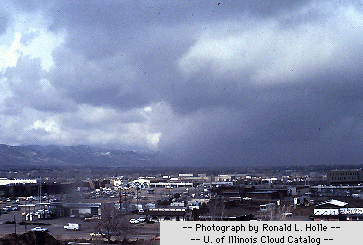
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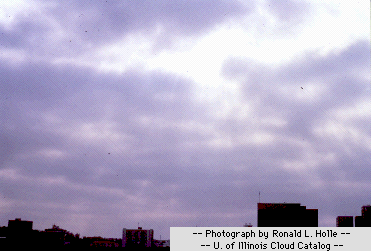
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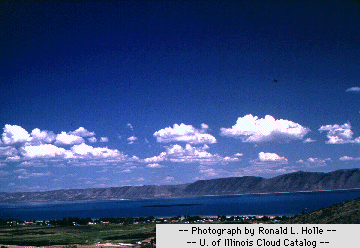
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**Short Answer**

1. What does the Beaufort Scale measure?
2. What is a virga?
3. What are contrails?
4. List some of the effects of El Nino.
5. The change of substance state from water vapor to liquid water is called  (1.) sublimation (2.) evaporation  (3.) freezing   (4.) condensation
6. The main greenhouse gas in our atmosphere is  (1.) helium   (2.) carbon dioxide   
           (3.) hydrogen   (4.) oxygen
7. Which is NOT used to describe climate?  (1.) air temperature  (2.) winds   
           (3.) moisture  (4.) energy use
8. The climate of a region describes the     (1.) season-to-season weather     (2.) day-to-day weather change (3.) storm tracks of the region    (4.) wind patterns of the region
9. Which is NOT true of climatic regions?  (1.) Large bodies of nearby water modify air temperatures.  (2.) Nearby mountains act as barriers. (3.) Air temperatures tend to decrease with altitude.   (4.) Air pressure rarely changes.
10. The latitude that receives the most direct rays of the sun throughout the year is   
            (1.) 60°N   (2.) 90°N or S   (3.) 30°S   (4.)  0°
11. \_\_\_\_\_ is an area's average weather over a long period.   (1.) A season   
           (2.) Temperature   (3.) Climate   (4.) A temperate zone
12. We help reduce the global warming problem when we  (1.) conserve energy   
           (2.)  burn coal   (3.)  produce methane   (4.)  remove trees
13. Which can affect climate?   (1.)  mountains   (2.)  large bodies of water   
            (3.) large cities   (4.) All of the above choices are correct.
14. As you climb a mountain, the  (1.) temperature tends to decrease (2.) temperature tends to increase   (3.) air pressure increases (4.) air pressure remains constant
15. Why are the areas between 30 degrees N/S and 35 degrees N/S called the horse latitudes?
16. Who discovered the Coriolis Effect?
17. What three clouds types are considered high clouds?
18. Cirrocumulus clouds are associated with the term \_\_\_\_\_\_\_ because of their resemblance to fish scales.
19. Middle clouds exist between \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_.
20. What two cloud types are considered middle clouds?
21. What is diffraction?